

In the Claims

A complete listing of the claims is presented hereinafter. Please cancel claims 45, 49, 51, 59, 63, 65, 73, 77, 87, 91 and 93. Please amend claims 42-44, 46-48, 50, 52, 56-58, 60-62, 64, 70-72, 74-76, 78-80, 84-86, 88-90, 92, 94, 97, 99, 101-105, 107-109, 111, 113 and 114, as follows:

1-40. (previously canceled)

41. (allowed) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

a portable device configured for movement by an individual operator for receiving the data signal relating to the operational parameter for use by the portable device and said portable device includes a display arrangement configured for using the data signal for display to the individual operator of the portable device; and

a communication arrangement for transferring the data signal from the drill rig to the portable device.

42. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore said boring tool including a locating signal transmitter which transmits a locating signal for locating an underground position of the boring tool, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

a portable device configured for movement by an ~~individual~~ operator and for receiving the data signal relating to the operational parameter for use by the portable device and said portable device including a locating section for receiving the locating signal, transmitted directly from the boring tool, for use in identifying the underground position of the boring tool; and

a communication arrangement for transferring the data signal from the drill rig to the portable device.

43. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said drilling system includes a drill string extending from the drill rig to the boring tool configured for receiving a push force applied by the drill rig to move the boring tool in a forward direction, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

a portable device configured for movement by an ~~individual~~ operator and configured for receiving the data signal relating to the operational parameter for use by the portable device and said portable device includes a display arrangement configured for using the data signal for display to the operator of the portable device;

a communication arrangement for transferring the data signal from the drill rig to the portable device; and

a push force sensing arrangement which generates a push force signal for inclusion as at least a portion of said data signal.

44. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and wherein said operational parameter is capable of violating at least a selected one of a minimum and a maximum predetermined value such that the detection arrangement generates a warning as part of the data signal;

a portable device configured for movement by an ~~individual~~ operator and configured for receiving the data signal relating to the operational parameter for use by the portable device and said portable device is configured for providing at least a selected one of an audio indication and a visual indication in response to receipt of the warning forming part of the data signal; and

a communication arrangement for transferring the data signal from the drill rig to the portable device and wherein said communication arrangement is configured for transferring, as part of said data signal, a said warning to said portable device that the selected predetermined value has been violated.

45. (canceled) The monitoring arrangement of Claim 44 wherein said portable device is configured for providing at least a selected one of an audio indication and a visual indication in response to receipt of said warning.

46. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is capable of violating at least a selected one of a minimum and a maximum predetermined value;

a portable device configured for movement by an ~~individual~~ operator and configured for receiving the data signal relating to the operational parameter for use by the portable device and wherein said portable device is configured for issuing a warning that the selected predetermined value has been violated and said portable device includes an indication arrangement configured for using the warning to generate at least one of an audio indication and a visual indication in response to issuing said warning; and

a communication arrangement for transferring the data signal from the drill rig to the portable device.

47. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is a push force with which the boring tool is being pushed forward by the drill rig such that a maximum push value

is established beyond which the boring tool may be damaged, said detection arrangement producing the data signal responsive to exceeding the maximum push value;

a portable device configured for movement by an ~~individual~~ operator and configured for receiving the data signal relating to the operational parameter for use by the portable device and further configured to provide an indication of violation of the maximum push value when the maximum push value is exceeded, said indication of violation being provided as at least one of an audio indication and a visual indication; and

a communication arrangement for transferring the data signal from the drill rig to the portable device.

48. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, and said boring tool uses drilling mud provided from said drill rig, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and wherein said operational parameter is a status of the drilling mud for inclusion as at least a portion of said data signal;

a portable device configured for movement by an ~~individual~~ operator and configured for receiving the data signal relating to the operational parameter for use by the portable device and said portable device is configured to provide an operator warning as at least one of an audio indication and a visual indication based on the status of said drilling mud; and

a communication arrangement for transferring the data signal from the drill rig to the portable device.

49. (canceled) The monitoring arrangement of Claim 48 wherein said portable device is configured to provide an operator warning based on the status of said drilling mud.

50. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool is attached to and moved by a drill string having one minimum bend radius and extending from the drill rig and a utility to be installed includes another minimum bend radius, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and wherein said detection arrangement at the drill rig includes a drill path monitoring arrangement for monitoring curvature of the underground bore being formed by the boring tool as said operational parameter and for comparing at least a selected one of the minimum bend radius of the drill string and the minimum bend radius of the utility with the curvature of the underground bore to form at least a portion of said data signal;

a portable device and configured for movement by an ~~individual~~ operator and configured for receiving the data signal relating to the operational parameter for use by the portable device and said portable device is configured for indicating that the selected minimum bend radius is being violated using at least one of an audio indication and a visual indication; and

a communication arrangement for transferring the data signal from the drill rig to the portable device.

51. (canceled) The monitoring arrangement of Claim 50 wherein said portable device is configured for indicating that the selected minimum bend radius is being violated.

52. (currently amended) The monitoring arrangement of Claim ~~54~~ 50 wherein the selected minimum bend radius is a greater one of the minimum bend radius of the drill string and the minimum bend radius of the utility and the portable device is configured to provide an indication of violation of the greater minimum bend radius.

53-54. (previously canceled)

55. (allowed) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising the steps of:

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an individual operator, for use by the portable device which includes a display arrangement; and using the data signal for a display presentation to the individual operator of the portable device.

56. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool includes a locating signal transmitter which transmits a locating signal for locating an underground position of the boring tool, a method comprising ~~the steps of~~:

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

transferring the data signal, relating to the operational parameter, to a portable device for use by the portable device; and

configuring the portable device for movement by an ~~individual~~ operator and for receiving the locating signal directly from said locating signal transmitter in the boring tool for use in identifying the underground position of the boring tool.

57. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said drilling system includes a drill string extending from the drill rig to the boring tool configured for receiving a push force applied by the drill rig to move the boring tool in a forward direction, a method comprising ~~the steps of~~:

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and sensing the push force to generate a push force signal for inclusion as at least a portion of said data signal; and

transferring the data signal, relating to the operational parameter, to a portable device that is configured for movement by an ~~individual~~ operator for use by the portable device in a display presentation to the operator of the portable device.

58. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method

comprising the steps of:

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is capable of violating at least a selected one of a minimum and a maximum predetermined value;

transferring the data signal, relating to the operational parameter, to a portable device that is configured for movement by an individual operator for use by the portable device and sending, as at least a portion of said data signal, a warning to said portable device that the selected predetermined value has been violated; and

indicating receipt of said warning at the portable device using at least a selected one of an audio indication and a visual indication.

59. (canceled) The method of Claim 58 including the step of indicating receipt of said warning at the portable device using at least a selected one of an audio indication and a visual indication.

60. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising the steps of:

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is capable of violating at least a selected one of a minimum and a maximum predetermined value;

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an individual operator thereof, for use by the portable device; and

issuing a warning, using said portable device, to the operator thereof, that the selected predetermined value has been violated.

61. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising the steps of:

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is a push force with which the boring tool is being pushed forward by the drill rig such that a maximum push value is established beyond which the boring tool will be damaged; and

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an individual operator thereof, for use by the portable device responsive to violation of the maximum push value when the maximum push value is exceeded and using the data signal for a display presentation to the operator of the portable device.

62. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool uses drilling mud provided from said drill rig:

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal

relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool as a status of the drilling mud for inclusion as at least a portion of said data signal; and

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device; and

issuing an operator warning using the portable device based on the status of said drilling mud as at least one of an audio indication and a visual indication.

63. (canceled) The method of Claim 62 including the step of issuing an operator warning using the portable device based on the status of said drilling mud.

64. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool is attached to and moved by a drill string having one minimum bend radius and extending from the drill rig and a utility to be installed includes another minimum bend radius, a method comprising the steps of:

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool as curvature of the underground bore being formed by the boring tool;

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device; and

comparing at least a selected one of the minimum bend radius of the drill string and the minimum bend radius of the utility with the curvature of the underground bore to form at least a portion of said data signal; and

using the portable device to indicate that the selected minimum bend radius is being violated by generating at least one of a visual indication and an audio indication.

65. (canceled) The method of Claim 64 including the step of using the portable device to indicate that the selected minimum bend radius is being violated.

66. (original) The method of Claim 64 including the steps of selecting the minimum bend radius as a greater one of the minimum bend radius of the drill string and the minimum bend radius of the utility and configuring the portable device to provide an indication of violation of the greater minimum bend radius.

67-68. (previously canceled)

69. (allowed) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

a portable device configured for movement by an individual operator thereof and for receiving the data signal relating to the operational parameter for use by the portable device and which includes a display arrangement configured for

using the data signal for display to the individual operator of the portable device; and

a communication arrangement for transferring the data signal from the detection arrangement to the portable device.

70. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool includes a locating signal transmitter which transmits a locating signal for locating an underground position of the boring tool, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

a portable device configured for movement by an ~~individual~~ operator thereof and for receiving the data signal relating to the operational parameter for use by the portable device and which includes a locating section for receiving the locating signal, directly from the boring tool, for use in identifying the underground position of the boring tool; and

a communication arrangement for transferring the data signal from the detection arrangement to the portable device.

71. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said drilling system includes a drill string extending from the drill rig to the boring tool configured for receiving a push force applied by the drill rig to move the boring tool in a forward direction, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and which generates a push force signal for inclusion as at least a portion of said data signal;

a portable device configured for movement by an ~~individual~~ operator thereof and for receiving the data signal relating to the operational parameter for use by the portable device and said portable device includes a display arrangement configured for using the data signal to produce a display to the operator of the portable device; and

a communication arrangement for transferring the data signal from the detection arrangement to the portable device.

72. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is capable of violating at least a selected one of a minimum and maximum predetermined value such that a warning is generated as part of said data signal;

a portable device configured for movement by an ~~individual~~ operator thereof, ~~and for receiving the data signal relating to the operational parameter for use by the portable device~~ and for providing at least a selected one of an audio indication and a visual indication in response to said warning produced by said detection arrangement as part of said data signal; and

a communication arrangement for transferring the data signal from the detection arrangement to the portable device and configured for transferring, as part of said data signal, a said warning to said portable device that said predetermined

value has been violated.

73. (canceled) monitoring arrangement of Claim 72 wherein said portable device is configured for providing at least a selected one of an audio indication and a visual indication in response to receipt of said warning.

74. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is capable of violating at least a selected one of a minimum and maximum predetermined value;

a portable device configured for movement by an ~~individual~~ operator thereof and for receiving the data signal relating to the operational parameter for use by the portable device and configured for issuing a warning that the selected predetermined value has been violated and said portable device includes a display arrangement configured for using the data signal for display to the operator of the portable device; and

a communication arrangement for transferring the data signal from the detection arrangement to the portable device.

75. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is a push force with which the boring tool is being pushed forward by the drill rig such that a maximum push value is established beyond which the boring tool may be damaged, said detection arrangement producing the data signal responsive to exceeding the maximum push value;

a portable device configured for movement by an ~~individual~~ operator thereof and for receiving the data signal relating to the operational parameter for use by the portable device and configured to provide an indication of violation of the maximum push value when the maximum push value is exceeded as at least one of an audio indication and a visual indication; and

a communication arrangement for transferring the data signal from the detection arrangement to the portable device.

76. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool uses drilling mud provided from said drill rig, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and wherein said operational parameter is a status of the drilling mud for inclusion as at least a portion of said data signal;

a portable device configured for movement by an operator thereof and for receiving the data signal relating to the

operational parameter for use by the portable device and said portable device is further configured to provide an operator warning based on the status of said drilling mud as one of at least an audio indication and a visual indication; and
a communication arrangement for transferring the data signal from the detection arrangement to the portable device.

77. (canceled) The monitoring arrangement of Claim 76 wherein said portable device is configured to provide an operator warning based on the status of said drilling mud.

78. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool is attached to and moved by a drill string having one minimum bend radius and extending from the drill rig and a utility to be installed includes another minimum bend radius, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and which detection arrangement at the drill rig includes a drill path monitoring arrangement for monitoring curvature of the underground bore being formed by the boring tool as said operational parameter and for comparing at least a selected one of the minimum bend radius of the drill string and the minimum bend radius of the utility with the curvature of the underground bore to form at least a portion of said data signal;

a portable device configured for movement by an ~~individual~~ operator thereof and for receiving the data signal relating to the operational parameter for use by the portable device and said portable device includes a display arrangement configured for using the data signal for display to the operator of the portable device; and

a communication arrangement for transferring the data signal from the detection arrangement to the portable device.

79. (currently amended) The monitoring arrangement of Claim 78 wherein said portable device is configured for indicating that the selected minimum bend radius is being violated, using said display arrangement.

80. (currently amended) The monitoring arrangement of Claim 79 wherein the selected minimum bend radius is a greater one of the minimum bend radius of the drill string and the minimum bend radius of the utility and the portable device is configured to provide an indication of violation of the greater minimum bend radius, using said display arrangement.

81-82. (previously canceled)

83. (allowed) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising the steps of:

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool; and

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an individual operator thereof, for use by the portable device, which includes a display arrangement; and using the data signal for a display presentation to the individual operator of the portable device.

84. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring

tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool includes a locating signal transmitter which transmits a locating signal for locating an underground position of the boring tool, a method comprising ~~the steps of~~:

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

transferring the data signal, relating to the operational parameter, to a portable device, for use by the portable device; and

configuring the portable device for movement by an ~~individual~~ operator thereof and for receiving the locating signal, directly from the locating signal transmitter, for use in identifying the underground position of the boring tool.

85. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said drilling system includes a drill string extending from the drill rig to the boring tool configured for receiving a push force applied by the drill rig to move the boring tool in a forward direction, a method comprising ~~the steps of~~:

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and for sensing the push force to generate a push force signal for inclusion as at least a portion of said data signal; and

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof for use by the portable device; and

using the data signal for a display presentation to the operator of the portable device.

86. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising ~~the steps of~~:

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is capable of violating a minimum or maximum predetermined value; and

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device and sending, as at least a portion of said data signal, a warning to said portable device that said predetermined value has been violated; and

indicating receipt of said warning at the portable device using at least a selected one of an audio indication and a visual indication.

87. (canceled) The method of Claim 86 including the step of indicating receipt of said warning at the portable device using at least a selected one of an audio indication and a visual indication.

88. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising ~~the steps of~~:

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal

relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is capable of violating a minimum or maximum predetermined value; ~~and~~

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device; and

issuing a warning, using said portable device, that the selected predetermined value has been violated as at least one of an audio indication and a visual indication.

89. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising ~~the steps of:~~

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said operational parameter is a push force with which the boring tool is being pushed forward by the drill rig such that a maximum push value is established beyond which the boring tool will be damaged; ~~and~~

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device responsive to violation of the maximum push value when the maximum push value is exceeded; ~~and~~

using the data signal for a display presentation to the operator of the portable device.

90. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool uses drilling mud provided from said drill rig, a method comprising ~~the steps of:~~

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool as a status of the drilling mud for inclusion as at least a portion of said data signal; ~~and~~

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device; ~~and~~

issuing an operator warning as at least one of an audio indication and a visual indication, using the portable device, based on the status of said drilling mud.

91. (canceled) The method of Claim 90 including the step of issuing an operator warning using the portable device based on the status of said drilling mud.

92. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore and said boring tool is attached to and moved by a drill string having one minimum bend radius and extending from the drill rig and a utility to be installed includes another minimum bend radius, a method comprising ~~the steps of:~~

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool as curvature of the underground bore being formed by the boring tool;

comparing at least a selected one of the minimum bend radius of the drill string and the minimum bend radius of the utility with the curvature of the underground bore to form at least a portion of said data signal; ~~and~~

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device; and

using the portable device to indicate that the selected minimum bend radius is being violated.

93. (canceled) The method of Claim 92 including the step of using the portable device to indicate that the selected minimum bend radius is being violated.

94. (currently amended) The method of Claim ~~93~~ 92 including the steps of selecting the minimum bend radius as a greater one of the minimum bend radius of the drill string and the minimum bend radius of the utility and configuring the portable device to provide an indication of violation of the greater minimum bend radius.

95-96. (previously canceled)

97. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and said detection arrangement is configured for detecting a range of the operational parameter for which an out of range condition of the operational parameter can result in a catastrophic equipment failure;

a portable device configured for movement by an ~~individual~~ operator thereof, ~~and~~ for receiving the data signal relating to the operational parameter for use by the portable device and said portable device includes a display arrangement configured for using the data signal for display to the operator of the portable device; and

a communication arrangement for transferring the data signal from the drill rig to the portable device.

98. (previously amended) The monitoring arrangement of Claim 97 wherein the detection arrangement is further configured for detecting the operational parameter as at least one of a push force which drives the boring tool, a temperature of the boring tool, a pressure of a drilling mud that is supplied to the boring tool, a status of a battery used in the boring tool, a curvature of the underground bore and a proximity of the boring tool to an underground utility.

99. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising ~~the steps of:~~

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool to detect a range of the operational parameter for which an out of range condition of the operational parameter can result in a catastrophic equipment failure; and

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device; and

using the data signal at the portable device for a display presentation to the operator of the portable device.

100. (previously added) The method of Claim 99 including the step of detecting the operational parameter as at least one of a push force which drives the boring tool, a temperature of the boring tool, a pressure of a drilling mud that is supplied to the boring tool, a status of a battery used in the boring tool, a curvature of the underground bore and a proximity of the boring tool to an underground utility.

101. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool and configured for detecting a range of the operational parameter for which an out of range condition of the operational parameter can result in a catastrophic equipment failure;

a portable device configured for movement by an ~~individual~~ operator thereof and for receiving the data signal relating to the operational parameter for use by the portable device and said portable device includes a display arrangement configured for using the data signal for display to the operator of the portable device; and

a communication arrangement for transferring the data signal from the detection arrangement to the portable device.

102. (previously added) The monitoring arrangement of Claim 101 wherein the detection arrangement is further configured for detecting the operational parameter as at least one of a push force which drives the boring tool, a temperature of the boring tool, a pressure of a drilling mud that is supplied to the boring tool, a status of a battery used in the boring tool, a curvature of the underground bore and a proximity of the boring tool to an underground utility.

103. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising ~~the steps of:~~

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool for detecting a range of the operational parameter for which an out of range condition of the operational parameter can result in a catastrophic equipment failure; ~~and~~

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device; and

using the data signal for a display presentation to the operator of the portable device.

104. (previously added) The method of Claim 103 including the step of detecting the operational parameter as at least one of a push force which drives the boring tool, a temperature of the boring tool, a pressure of a drilling mud that is supplied to the boring tool, a status of a battery used in the boring tool and a proximity of the boring tool to an underground utility.

105. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring

tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement at said drill rig for monitoring at least one operational parameter to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

a portable device configured for movement by an individual operator thereof and for receiving the data signal relating to the operational parameter for use by the portable device and said portable device includes a display arrangement configured for using the data signal for display to the operator of the portable device; and

a communication arrangement for transferring the data signal from the drill rig to the portable device.

106. (previously added) The monitoring arrangement of Claim 105 wherein said communication arrangement includes a telemetry link between the detection arrangement at the drill rig and the portable device for transferring the data signal to the portable device.

107. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising:

monitoring at least one operational parameter using a detection arrangement at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool; ~~and~~

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an individual operator thereof, for use by the portable device; and

using the data signal for a display presentation to the operator of the portable device.

108. (previously added) The method of Claim 107 including the step of providing a telemetry link between the detection arrangement at the drill rig and the portable device and said transferring step includes the step of using the telemetry link for transmitting the data signal to the portable device.

109. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a monitoring arrangement comprising:

a detection arrangement for monitoring at least one operational parameter which is at least measurable at the drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool;

a portable device configured for movement by an individual operator thereof, ~~and~~ for receiving the data signal relating to the operational parameter for use by the portable device and said portable device includes a display arrangement configured for using the data signal for display to the operator of the portable device; and

a communication arrangement for transferring the data signal from the detection arrangement to the portable device.

110. (previously amended) The monitoring arrangement of Claim 109 wherein said communication arrangement includes a telemetry link between the detection arrangement at the drill rig and the portable device for transferring the data signal to the portable device.

111. (currently amended) In a drilling system for performing underground boring including a drill rig and a boring tool which is configured for moving through the ground under control of the drill rig to form an underground bore, a method comprising:

monitoring at least one operational parameter which is at least measurable at said drill rig to produce a data signal relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool; ~~and~~

transferring the data signal, relating to the operational parameter, to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device; ~~and~~

using the data signal for a display presentation to the operator of the portable device.

112. (previously amended) The method of Claim 111 including the step of providing a telemetry link between the detection arrangement at the drill rig and the portable device and said transferring step includes the step of using the telemetry link for transmitting the data signal to the portable device.

113. (currently amended) In a drilling system for performing an underground boring operation including a drill rig and a boring tool which is configured for moving through the ground using a drill string which extends from the drill rig to the boring tool such that the underground boring operation forms an underground bore, a monitoring arrangement comprising:

a first arrangement for transferring at least one operational parameter through the drill string from the boring tool to the drill rig, said operational parameter relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool; ~~and~~

a second arrangement, at least partially located at said drill rig, for receiving the parameter from the drill string and for transmitting the operational parameter; and

a portable device configured for movement by an ~~individual~~ operator thereof and at least for receiving the operational parameter as transmitted by the second arrangement for use by the portable device ~~and said portable device includes a display arrangement configured for using the data signal for display to the operator of the portable device.~~

114. (currently amended) In a drilling system for performing an underground boring operation including a drill rig and a boring tool which is configured for moving through the ground using a drill string which extends from the drill rig to the boring tool such that the underground boring operation forms an underground bore, a method comprising the steps of:

transferring at least one operational parameter through the drill string from the boring tool to the drill rig, said operational parameter relating to at least one of a utility to be installed in the underground bore, the drill rig and the boring tool; ~~and~~

transmitting a data signal, relating at least to the operational parameter as received, from the drill rig to a portable device, that is configured for movement by an ~~individual~~ operator thereof, for use by the portable device; ~~and~~
using the data signal for a display presentation to the operator of the portable device.

Please add new claims 115 through 122, as follows:

115. The monitoring arrangement of claim 42 including a display arrangement, forming part of the portable device, for producing a display based on said data signal.

116. The monitoring arrangement of claim 44 wherein said portable device includes a display arrangement for providing said visual display indication.

117. The method of claim 56 including a display arrangement, forming part of the portable device, for producing a display based on said data signal.

118. The method of claim 60 including using a display arrangement, forming part of the portable device, for displaying said warning.

119. The monitoring arrangement of claim 70 including a display arrangement, forming part of the portable device, for producing a display based on said data signal.

120. The method of claim 84 including using a display arrangement, forming part of the portable device, for producing a display based on said data signal.

121. The method of claim 88 including using a display arrangement, forming part of the portable device, for displaying said warning.

122. The method of claim 92 including using a display arrangement, forming part of the portable device, for producing a visual display indicating to indicate that the selected minimum bend radius is being violated.